

max maths primary

A SINGAPORE APPROACH

Student Book
6



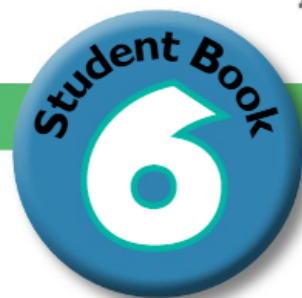
 **macmillan**
education
INTERNATIONAL CURRICULUM

TONY COTTON
ALICE HANSEN

DANIEL COLE
DR BERINDERJEET KAUR

max maths primary

A SINGAPORE APPROACH



TONY COTTON
ALICE HANSEN

DANIEL COLE
DR BERINDERJEET KAUR

Macmillan Education
4 Crinan Street
London, N1 9XW
A division of Macmillan Publishers Limited

Companies and representatives throughout the world

www.macmillanic.com

ISBN 978-1-380-01269-2

Text © Macmillan Publishers Limited and Star Publishing Pte Ltd 2018
Based on *Star Mathematics 6A Textbook* © Star Publishing Pte Ltd, Daniel Cole and
Dr Berinderjeet Kaur 2010, and *Star Mathematics 6B Textbook* © Star Publishing Pte Ltd,
Daniel Cole and Dr Berinderjeet Kaur 2011
Design and illustration © Macmillan Publishers Limited

The authors have asserted their right to be identified as the authors of this work in accordance
with the Copyright, Design and Patents Act 1988.

First published 2018

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system,
or transmitted in any form, or by any means, electronic, mechanical, photocopying, recording,
or otherwise, without the prior written permission of the publishers.

Page layout, illustrations and picture research by Star Publishing Pte Ltd
Cover design by Macmillan Education
Cover illustration by Daniel Limon/Beehive Illustration Ltd

Printed and bound in the UK

2022 2021 2020 2019 2018
10 9 8 7 6 5 4 3 2 1

The authors and publishers would like to thank the following for permission to reproduce their images.

© **Stockdisc Royalty Free Photos**/© Stockdisc Royalty Free Photos pp101(tr), 166(c)

Brand X/pp73(tr), 166(t)

Comstock Images/pp72(tl), 99(tl), 173(pear)

Corbis/pp165(football, basketball)

Digitalvision/p199(t)

Getty/pp12(l), 13(l), 64(tr), 99(bl), 101(cl, bm, bm, br), 110(cml, cr), 115(jelly beans), 144(bc), 162(t), 164(tc, tr), GETTY/Photodisc p42(tr)

Getty Images/iStockphoto/Thinkstock/Laurent davoust p202(t), Getty Images/iStockphoto/digitalimagination p76(t), Getty Images/EyeEm/Pete Farrington/EyeEm p144(bl), Getty Images/Thinkstock Images/Hemera Technologies pp76(tl), 197(b), Getty Images/Ingram Publishing Thinkstock Images/Ingram Publishing pp110(cl), 173(red apple), Getty Images/iStockphoto/LightSecond pp11(bcl), 79(bcl), 120(tl), Getty Images/iStockphoto Thinkstock Images/Anzor Mizaushev p101(tl), Getty Images/Andersen Ross p72(tl), Getty Images/iStockphoto/scissetialfio pp92(tr), 102(tl), Getty Images/iStockphoto Thinkstock Images/TPopova p144(t), Getty Images/iStockphoto Thinkstock Images/Alexander Yakovlev p191(br), Getty Images/iStockphoto/yang5i p100(tl)

Image Source/pp42(tml), 173(green apple)

Macmillan Publishers Limited/Paul Bricknell p109(cml, cm), Macmillan Publishers Limited/Paul Bricknell/Dean Ryan p101(bl)






Macmillan Australia/pp167(spoon, knife, fork)

Macmillan New Zealand/pp99(tr), 170(t)

Photodisc/pp100(coconut), 110(cmr), Photodisc/Getty Images pp99(cl), 101(cr), 121(l), 197(bc), Photodisc/Thinkstock Images p72(tr)

Stockbyte/pp109(cl, cr), 144(tc)

Contents

	Preface	vi
	1 Numbers up to 1 000 000	2
	How the number system developed	4
	Numbers to the millions	6
	Prime and composite numbers	12
	Factors and multiples	20
	Comparing and ordering numbers within 1 000 000	24
	Rounding numbers	29
	Number sequences	31
	2 Addition and subtraction	34
	Review of addition and subtraction	36
	Mental addition and subtraction	38
	Addition of 2- and 3-digit numbers	42
	Review of adding and subtracting decimals	47
	Finding the difference between positive and negative integers	52
	3 Multiplication and division	56
	Multiplying by a 1-digit number	58
	Multiplication word problems	63
	Dividing 3-digit numbers by 2-digit numbers	66
	Division word problems	72
	Multiplying and dividing by multiples of 10	75
	Multiplying near multiples of 10	80
	Review of divisibility facts for 2, 4, 5, 10, 25 and 100	82
	Mental multiplication	84
	4 Length, mass and capacity	88
	Converting between units of measurement	90
	Measuring length	96
	Measuring mass	99
	Measuring volume	102
	Imperial units	105
	5 Statistics	106
	Review of pictograms	108
	Review of block graphs	110
	Review of bar graphs	112
	Review of line graphs	113
	Mode, range, median and mean	114
	Probability	121
	Equally likely outcomes	123

6	Position and movement	124
	Plotting coordinates	126
	Reflections	129
	Translations	131
	Rotations	133
7	Geometry	134
	Review of 2D shapes	136
	Polygons	137
	Quadrilaterals	138
	Review of 3D shapes	144
	Sketching 3D shapes	147
	Estimating and measuring angles	149
	Angles in a triangle	152
8	Fractions	154
	Fractions and equivalent decimals	156
	Recognising equivalence between fractions	157
	Improper fractions	160
	Mixed numbers	162
	Fractions in their simplest form	164
	Converting fractions to decimals	168
	Word problems	171
9	Decimals	174
	Review of place value in 1- and 2-place decimal numbers	176
	Mental methods for calculation with decimals	181
	Review of rounding numbers and ordering decimals	184
	Review of pairs of 1-place decimals totalling 10	187
	Word problems	188
10	Percentages	194
	Finding percentages of quantities and shapes	196
11	Time	204
	Time review	206
	Using timetables	210
	Calendars	212
	Time zones	214
12	Perimeter and area	216
	Review of perimeter and area	218
	Finding areas by counting squares	221
	Perimeters of compound shapes	224
	Areas of compound shapes	229



Preface

max maths Primary – A Singapore Approach is a mathematics course specially designed to meet the needs of learners following the **Cambridge Primary** curriculum framework in Stages 1 to 6.

The **Max Maths Primary** student books guide learners through key mathematical concepts, addressing the learning objectives in the **Cambridge Primary** curriculum framework. Each topic begins with an engaging introduction followed by scaffolded activities that ensure learners have grasped the necessary concepts, skills and knowledge. A variety of exercises, games and cooperative learning activities are included in each chapter to reinforce problem-solving skills and provide the opportunity for learners to develop their content knowledge.

Student book features



Chapter openers

Each chapter is introduced with clearly defined learning objectives and provides a real-world context for teachers to facilitate discussion with the class.

The Max Maths team



Samir



Jade



Toby



Padma



Han



Tya

Engaging photographs and illustrations

Colourful illustrations and photographs help to engage learners and encourage an enthusiastic approach to learning mathematics.

Time zones
Let's Learn Together

This map shows all the different time zones around the world.



All times are measured from Greenwich Mean Time (GMT). Greenwich is in London, in the United Kingdom.
We can see from this map that Alaska is 9 hours behind GMT.
Eastern Australia is 10 hours ahead of GMT.
We can find out what time it is in another country using this map.

1 What time is it in Egypt when it is 09:00 in Western Australia?
Egypt is +2 GMT. Western Australia is +8 GMT. This means that Western Australia is 6 hours ahead of the time in Egypt.
So, at 09:00 in Western Australia it is 03:00 in Egypt.

2 What time is it in China when it is 10:00 in Greenland?
China is +8 GMT. Greenland is -3 GMT. This means that China is 11 hours ahead of the time in Greenland.
So, at 10:00 in Greenland it is 21:00 in China.

Let's Try It

1 Write down how many hours ahead (+) or behind (-) GMT the following places are:

(a) Angola

(b) Chile

(c) Japan

(d) Egypt

(e) Thailand

2 When it is 9:00 a.m. in New York what time is it in the following places?
(a) Saudi Arabia

(b) London

(c) Bangkok

(d) New Zealand

(e) Alaska

Multiplying by a 1-digit number
Let's Learn Together

1 What is 243 multiplied by 4?

We can multiply each place value by 4 and add the results.

2	4	3
1	2	4
1	4	0
8	0	0

Multiply the ones: $4 \times 3 = 12$
Multiply the tens: $4 \times 40 = 160$
Multiply the hundreds: $4 \times 200 = 800$

Now we can add the numbers together to find the answer.

1	2	4
1	4	0
8	0	0
4	7	2

$2 + 0 + 0 = 2$
 $1 + 4 + 0 = 7$
 $8 + 0 + 0 = 8$

So, 243 multiplied by 4 is 972.

Let's Try It

1 What is the product of 436 and 7? Find an estimate first.
436 = (rounded to the nearest hundred)
Estimate:

4	3	6
3	0	0
3	0	0

$436 \times 7 =$

Is the answer close to the estimate?

2 What is the product of 854 and 4? Find an estimate first.
854 = (rounded to the nearest hundred)
Estimate:

8	5	4
3	0	0
3	0	0

$854 \times 4 =$

Is the answer close to the estimate?

Scaffolded learning

Each mathematics topic provides scaffolding for learners ensuring they have a solid grasp of each topic before practising and applying concepts learnt.

Let's Practise

Months	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Water level (m)	-2	-4	-7	-5	-4	0	5	7	9	5	0	0

1 What is the difference in water level between August and June?


2 What is the difference in water level between August and April?

3 What is the difference in water level between June and February?

4 What is the difference in water level between February and January?

5 When do you think the rainy season is in this country?

Work Together



Use the internet to research the average temperatures each month in 4 different countries. Try to find countries that have an average temperature below zero in the winter. Draw a table to show the temperatures for each country and each month. Choose 3 different months and organise the countries from coldest to hottest.

Cooperative learning

Games, activities and challenging problem-solving questions encourage cooperative learning and make learning mathematics fun and exciting.

1 Measure the length of the lines with a ruler. Write the length in centimetres and millimetres.

(a) cm mm

(b) cm mm

(c) cm mm

(d) cm mm

(e) cm mm

Let's Practise

Use the dotted paper below to draw the following lines.

(a) A green line of length 5.7 cm

(b) A red line of length 11.7 cm


(c) A black line of length 6.9 cm

(d) A blue line of length 12.3 cm

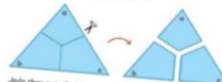
(e) A yellow line of length 9.9 cm

Angles in a triangle
Let's Learn Together


1 Jade drew a triangle on a piece of paper and cut it out. She labelled each corner of the triangle.



She then cut the triangle into 3 pieces.



Jade then put all of the corners together. Look at what she discovered.



The sum of the angles in a triangle is always 180°.

$\angle a + \angle b + \angle c = 180^\circ$

180° is the sum of the angles in a triangle.

Cambridge Primary curriculum framework

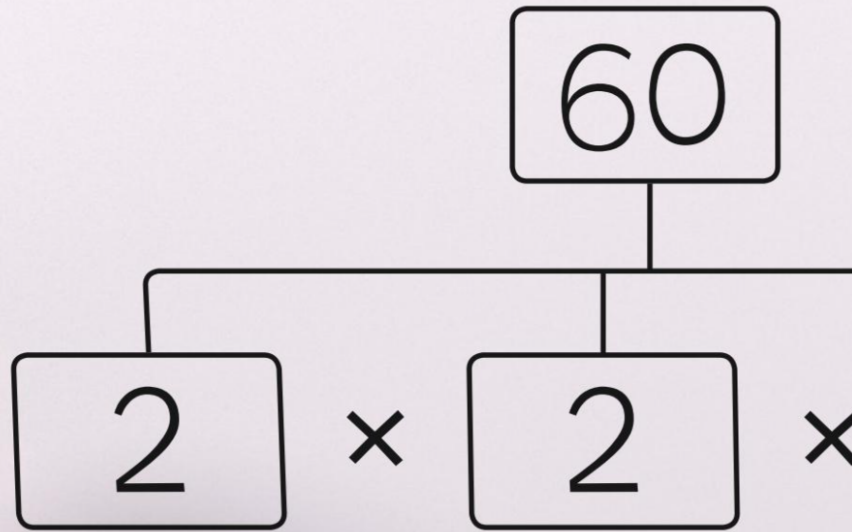
In the spirit of the Cambridge Primary curriculum framework, practical activities that encourage conceptual understanding and problem-solving are included.

Workbook links

Workbook links provide guidance to teachers and learners by directing them to the corresponding activities in the workbook.

1

Numbers up to 1 000 000



2

$$\boxed{3} \times \boxed{?}$$



You will learn to ...

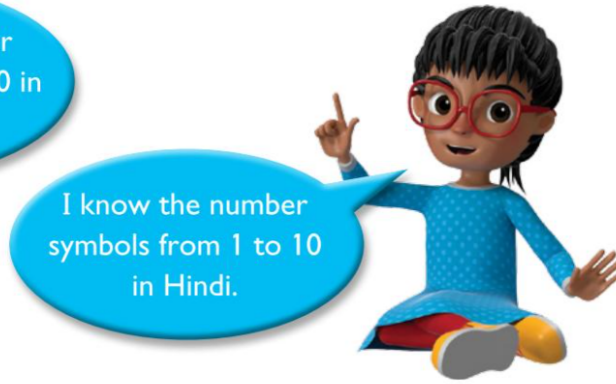
- recognise the historical origins of the number system
- read and write numbers up to 1 000 000
- identify prime numbers
- estimate, approximate and round whole numbers
- estimate where to place numbers on number lines
- make general statements about odd and even numbers.

How the number system developed

Let's Learn Together



I know the number symbols from 1 to 10 in Arabic.



I know the number symbols from 1 to 10 in Hindi.

The symbols we have used in this book are called Hindu-Arabic. We can draw the symbols in a table.

Hindu-Arabic	0	1	2	3	4	5	6	7	8	9
Western Arabic-Indic	٠	١	٢	٣	٤	٥	٦	٧	٨	٩
Devanagari (Hindi)	०	१	२	३	४	५	६	७	८	९

一	二	三	四	五
六	七	八	九	十

My friend has taught me how to write the numbers 1 to 10 in Cantonese.



We can use these tables to write numbers in different scripts. This table shows numbers in four different scripts.

Hindu-Arabic	Arabic	Bengali	Cantonese
26	٢٦	২৬	二十六
35	٣٥	৩৫	三十五
59	٥٩	৫৯	五十九
84	٨٤	৮৪	八十四

Let's Try It

Use the examples of numbers in different scripts to complete this table. If you know numbers in another script complete the final column using this script.

Hindu-Arabic	Arabic	Bengali	Cantonese	Other
13				
35				
56				
68				
82				



Heads Together



In groups find and download a 100 square in a script that you do not normally use. The example here is in Bengali. Cut it up to make a jigsaw. Give it to another group to see if they can put it back together.



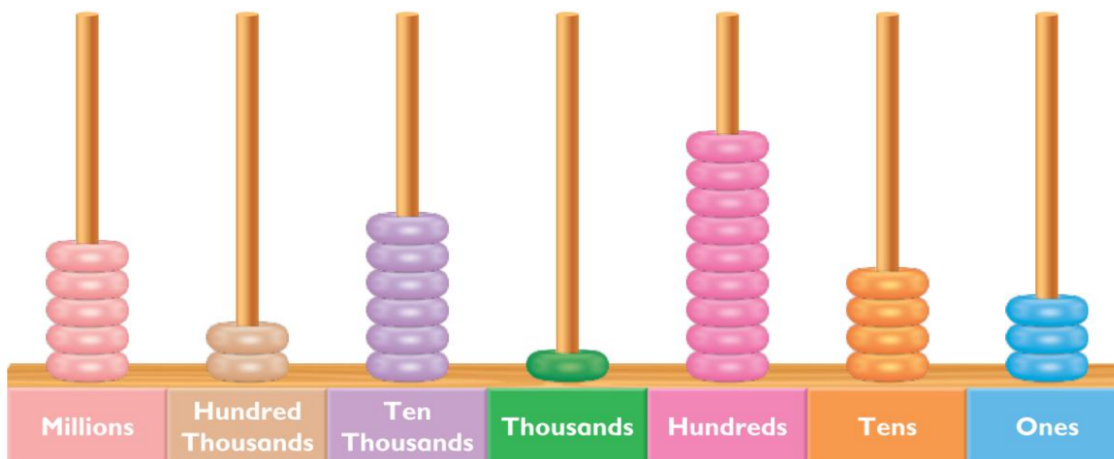
Use the internet to help you to learn to count to ten in a language that you do not normally use.

১	২	৩	৪	৫	৬	৭	৮	৯	১০
১১	১২	১৩	১৪	১৫	১৬	১৭	১৮	১৯	২০
২১	২২	২৩	২৪	২৫	২৬	২৭	২৮	২৯	৩০
৩১	৩২	৩৩	৩৪	৩৫	৩৬	৩৭	৩৮	৩৯	৪০
৪১	৪২	৪৩	৪৪	৪৫	৪৬	৪৭	৪৮	৪৯	৫০
৫১	৫২	৫৩	৫৪	৫৫	৫৬	৫৭	৫৮	৫৯	৬০
৬১	৬২	৬৩	৬৪	৬৫	৬৬	৬৭	৬৮	৬৯	৭০
৭১	৭২	৭৩	৭৪	৭৫	৭৬	৭৭	৭৮	৭৯	৮০
৮১	৮২	৮৩	৮৪	৮৫	৮৬	৮৭	৮৮	৮৯	৯০
৯১	৯২	৯৩	৯৪	৯৫	৯৬	৯৭	৯৮	৯৯	১০০

Numbers to the millions

Let's Learn Together

- 1 Look at the beads below. Can you write the number they represent? Can you write the number in words?



5	0	0	0	0	0	0
	2	0	0	0	0	0
		6	0	0	0	0
			1	0	0	0
				9	0	0
					4	0
						3

five million

two hundred thousand

sixty thousand

one thousand

nine hundred

forty

three



5	2	6	1	9	4	3
---	---	---	---	---	---	---

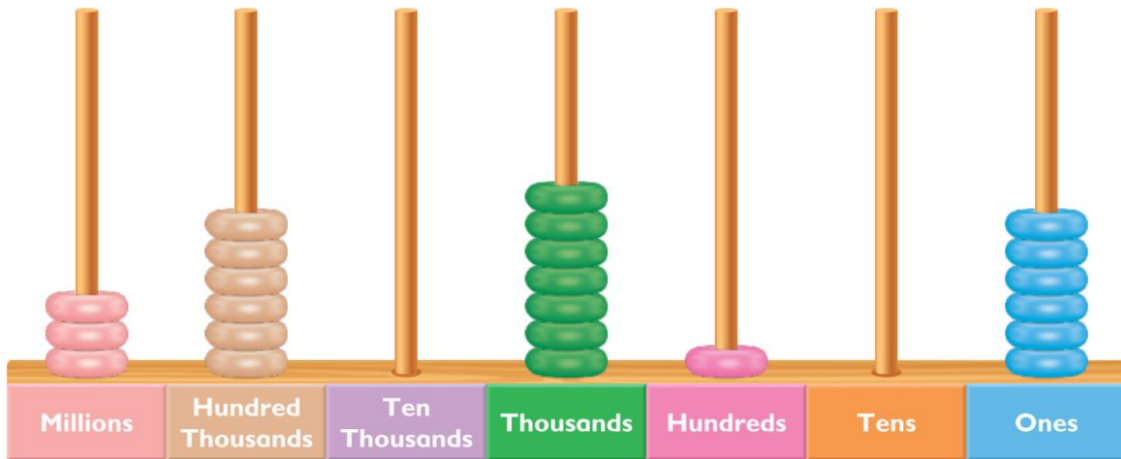
$$5\,000\,000 + 200\,000 + 60\,000 + 1\,000 + 900 + 40 + 3 = 5\,261\,943$$

We read and write 5 261 943 as five million, two hundred and sixty-one thousand, nine hundred and forty-three.





2 Let's write the number represented by the beads as a numeral and in words.



3	0	0	0	0	0	0	three million
	6	0	0	0	0	0	six hundred thousand
		0	0	0	0	0	
			7	0	0	0	seven thousand
				1	0	0	one hundred
					0	0	
						6	six
3	6	0	7	1	0	6	

$$3000000 + 600000 + 7000 + 100 + 6 = 3607106$$

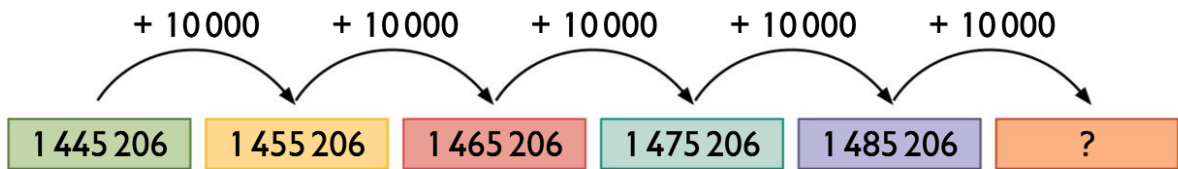
We read and write 3 607 106 as three million, six hundred and seven thousand, one hundred and six.



3 Tya starts with the number 1 445 206 and counts by 10 000s.

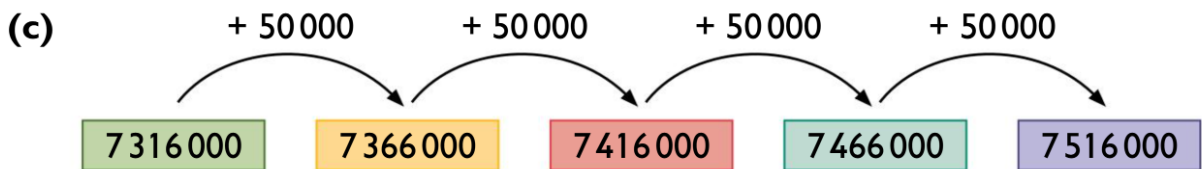
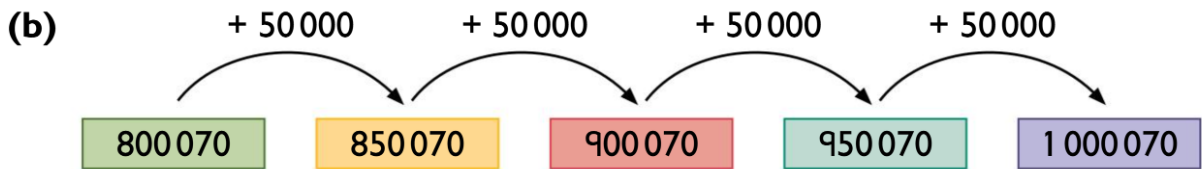
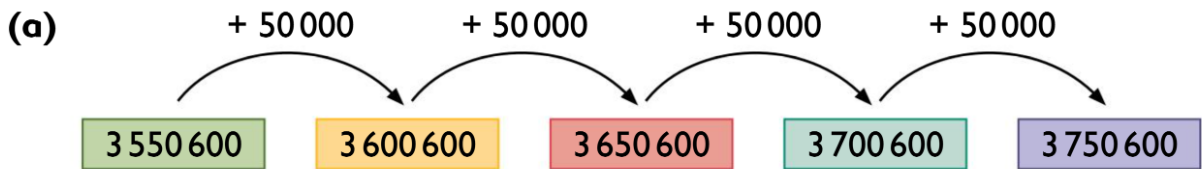


Which digit changes when I count by 10 000s?

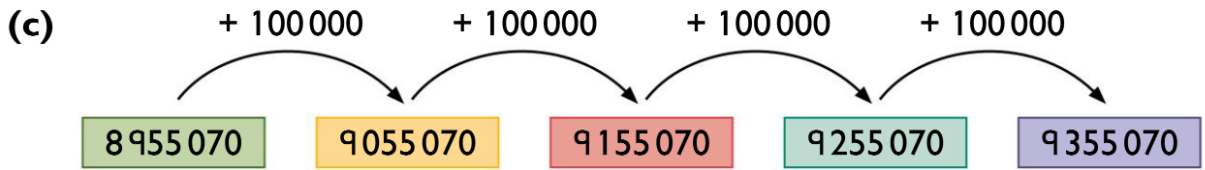
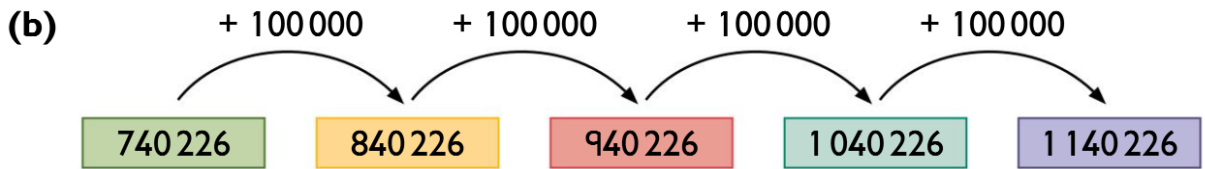
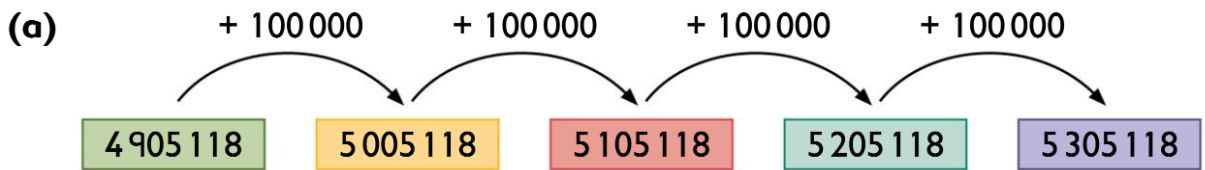


What number comes next?

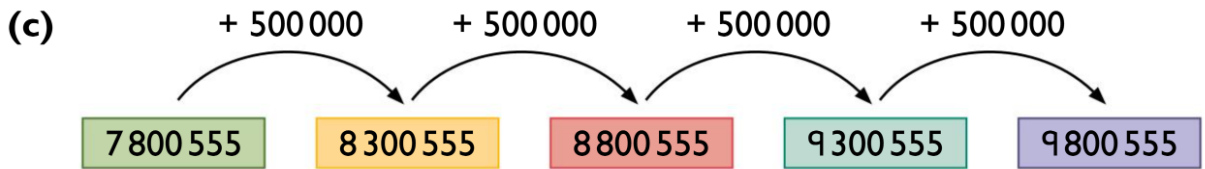
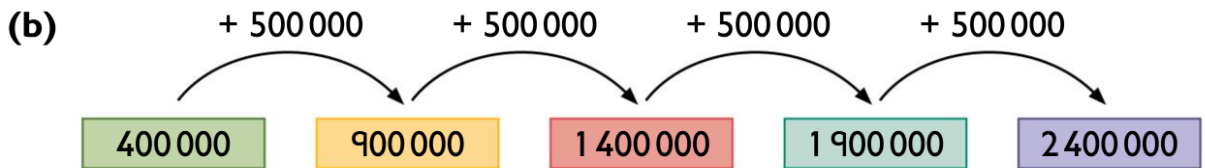
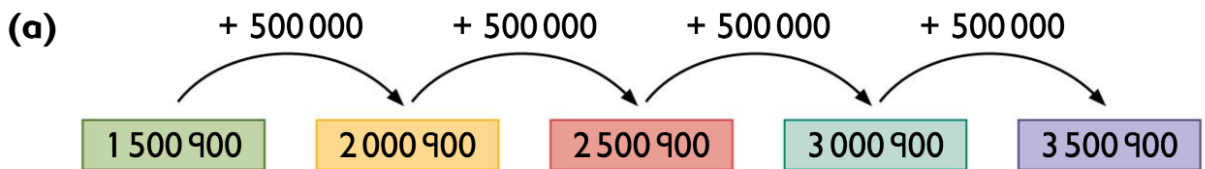
4 Let's count by 50 000s.



5 Let's count by 100 000s.

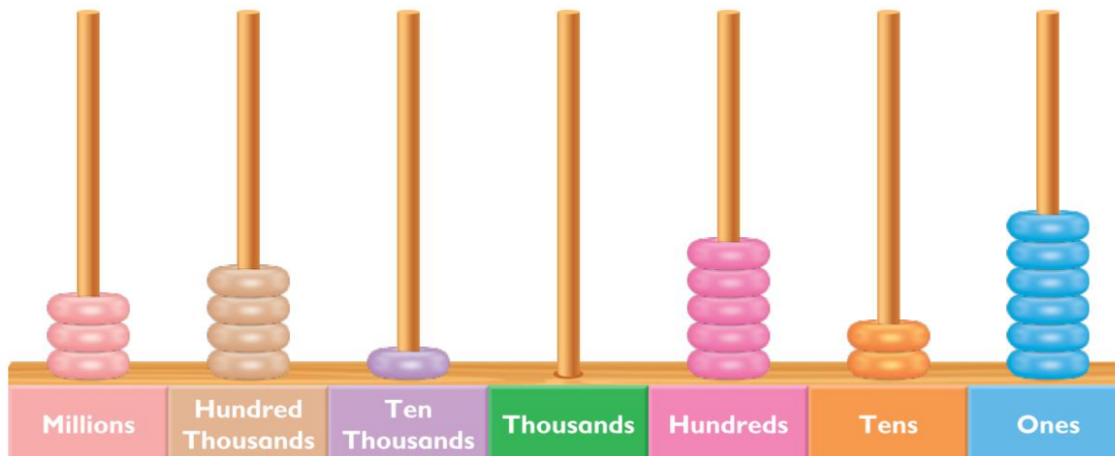


6 Let's count by 500 000s.



Let's Try It

- 1 Write the number represented by the beads in numerals and in words.



- 2 Look at the numbers. This sequence is formed by counting up.

(a) 4 480 100, 4 580 100, 4 680 100, 4 780 100, 4 880 100

I am counting up in .

(b) 84 533, 134 533, 184 533, 234 533, 284 533, 334 533

I am counting up in .

(c) 5 720 500, 6 220 500, 6 720 500, 7 220 500, 7 720 500

I am counting up in .

(d) 2 855 603, 3 855 603, 4 855 603, 5 855 603, 6 855 603

I am counting up in .





Let's Practise

1 Write the numbers in words.

(a) 1 990 101

(b) 2 005 300

(c) 5 325 268



2 Fill in the blanks.

(a) 3 000 000, 3 100 000, 3 200 000, 3 300 000,

(b) 6 000 700,

, 6 200 700, 6 300 700, 6 400 700,

(c) , 7 148 805, 7 198 805, 7 248 805, 7 298 805,

(d) , , 3 005 600, 4 005 600, 5 005 600, 6 005 600

 **Go to WB pages 2 to 7**



Calculate It

It is easy to count by large numbers using a calculator.

Step 1

Turn on your calculator and type a 7-digit number.

For example, the number 1 234 567.

Step 2

Press the '+' button and then enter the number you want to count by.

For example, 50 000. Then press the '=' button. The answer is displayed.

Try starting with different numbers and counting by different large numbers, for example, 100 000, 500 000.



Prime and composite numbers

Let's Learn Together

- 1 Jade has 12 jelly beans. She arranges them in different ways.



She makes 1 row of 12 jelly beans.

$$1 \times 12 = 12$$



She makes 2 rows of 6 jelly beans each.

$$2 \times 6 = 12$$



She makes 3 rows of 4 jelly beans each.

$$3 \times 4 = 12$$



We see that by arranging the jelly beans in different ways, Jade has shown us the factors of 12.

The factors of 12 are 1, 2, 3, 4, 6 and 12.

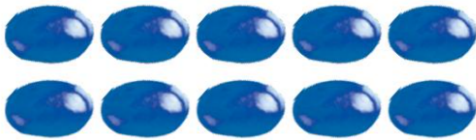


- 2 Samir has 10 jelly beans. He arranges them in different ways.



He makes 1 row of 10 jelly beans.

$$1 \times 10 = 10$$



He makes 2 rows of 5 jelly beans each.

$$2 \times 5 = 10$$

Samir has shown that the factors of 10 are 1, 2, 5 and 10.

We can only arrange the jelly beans in 2 ways.



- 3 Padma has 7 jelly beans. She tries to arrange them in different ways.



She makes 1 row of 7 jelly beans.

$$1 \times 7 = 7$$

She finds that this is the only way to arrange them.

This means that the factors of 7 are 1 and 7 only. Numbers that only have factors of 1 and themselves are a special kind of number. They are called **prime numbers**. Numbers that have more than 2 factors, like 10 and 12, are called **composite numbers**.

The only factors of 7 are 1 and itself.



- 4 Let's find the prime numbers up to 10. We can do this by finding the factors of each number.

Number	Factors	Is it prime?
1	1	No, prime numbers have 2 factors.
2	1, 2	Yes
3	1, 3	Yes
4	1, 2, 4	No
5	1, 5	Yes
6	1, 2, 3, 6	No
7	1, 7	Yes
8	1, 2, 4, 8	No
9	1, 3, 9	No
10	1, 2, 5, 10	No

So, there are 4 prime numbers up to 10. They are 2, 3, 5 and 7.

- 5 Look at the table in Question 4. You may see something interesting about the factors of composite numbers. The factors that are not 1 or the number itself are primes or multiples of primes.

$4 = 2 \times 2$	2 is a prime number.
$6 = 2 \times 3$	2 and 3 are prime numbers.
$8 = 2 \times 4$ $= 2 \times 2 \times 2$	2 is a prime number.
$9 = 3 \times 3$	3 is a prime number.
$10 = 2 \times 5$	2 and 5 are prime numbers.

So, all composite numbers are made up of prime factors.



The word 'composite' means made of parts.



- 6 By understanding that composite numbers have prime factors, we can find all of the prime numbers up to 100 using the following method.



Step 1

Cross out the number, 1, as we know it is not a prime number. The next number, 2, is a prime number. We know that all multiples of 2 are not prime numbers. So, we can cross out all multiples of 2.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Step 2

The next number, 3, is a prime number. Cross out all multiples of 3.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Step 3

The next number, 5, is a prime number. Cross out all multiples of 5.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Step 4

The next number, 7, is a prime number. Cross out all multiples of 7.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

If we repeat the process now, we find all of the multiples have already been crossed out. So, the numbers that remain are all prime numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

The prime numbers from 1 to 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.

